

Collagen

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Collagen kŏl' əjən, any of a group of proteins found in skin, ligaments, tendons, bone and cartilage, and other connective tissue. Cells called fibroblasts form the various fibers in connective tissue in the body. The fibroblasts produce three types of fibers to form the ground substance: collagen, elatin, and the reticulum. Collagen consists of groups of white inelastic fibers with great tensile strength. These fibers include fine fibrils, which are composed of even finer filaments, visible only through the electron microscope. Collagen protein contains an unusually high percentage of the amino acids proline and hydroxyproline. X-ray diffraction studies provide evidence that the protein forms a wavy band, a coiled chain with periodic, i.e., repeating, arrangement of its amino acids. Cartilage is composed of fibrous collagen in an amorphous gel. The organic (nonmineral) content of bone is made up largely of collagen fibers with calcium salt crystals lying adjacent to each segment of the fiber; the fibers and salt crystals combined form a structure with compressional and tensile strength comparable to that of reinforced concrete. A group of diseases, often termed collagen, or connective tissue, diseases, involve a variety of alterations in the connective tissue fibers; rheumatoid arthritis, rheumatic fever, lupus, and scleroderma are included in this group. Some of these diseases may involve an autoimmune response, in which the immune mechanism injures or destroys the individual's own tissues (see immunity). Collagen dissolved in boiling water becomes denatured to form gelatin.

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